

# Metabolic profiling of the α-proteobacteria *Rhodospirillum rubrum S1H* by $^{1}$H-NMR

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Current research increasingly recognizes purple non-sulfur bacteria *Rhodospirillum rubrum* for its high metabolic versatility. *Rs. rubrum* can grow under photoheterotrophic conditions using light energy and various volatile fatty acids and organic acids as carbon sources. Here we discuss a NMR profiling approach to evaluate the effect of succinate (as sole carbon source) on the metabolomics growth characteristics of *Rs. rubrum*. Metabolome variation of *Rs. rubrum* was studied under exponential and early stationary growth phase. Metabolite profiles generated by chloroform-methanol extraction of lyophilized extract was reproducible compared to methanol extraction method and comprised of a variety of different compounds like short-chain fatty acids (e.g. acetate, propionate, isobutyrate), organic acids (e.g. succinate, lactate, fumarate), amino acids, trehalose, sucrose, cholate. We also observed lower concentration of NAD, ATP, AMP, UDP derivatives. As expected, the levels of many identified metabolites showed significant increase or decrease depending on the growth phase. For instance, trehalose, which is a typical quiescence marker and a key storage carbohydrate, accumulated more in the stationary phase. We also observed lactate accumulation which indicated that pyruvate metabolism took place in the cells. The NMR profiling approach was validated and allowed for the analysis of the metabolic profile of *Rs. rubrum* cells in a fast and reproducible manner and provided quantitative information on a considerable number of metabolites. The optimised protocol will be applied when using acetate as sole carbon source to detect changes in the metabolic profile thereby allowing better understanding of metabolic pathways involved in acetate photoassimilation in *Rs. rubrum*.

## Biography

SFIHI-LOUALIA GHENIMA has completed her PhD from Lille 1 University. GHENIMA currently works at the Department of Proteomics and Microbiology, University of Mons. She is the author of five papers, with current research interests in all the steps in metabolomics workflow: experimental design, sample pretreatment, analytical methods for targeted and untargeted metabolomics, method validation, data treatment, compound identification and quantification. Her research is focused on the metabolic profiling of the α-proteobacteria *Rhodospirillum rubrum S1H* by $^{1}$H-NMR.

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